Saskatchewan Ministry of Agriculture

CROP PRODUCTION NEWS

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CROP PRODUCTION

PRODUCTION

Editor's Comments

By Faye Dokken-Bouchard, PAg, Crops Branch

Plant disease issues continue to cause concern in crops across Saskatchewan. Various leaf spotting diseases that are spread through rain splash are quite common. Sclerotinia white mould/stem rot can also impact various broadleaf crops. Particularly, lentil crops seem to be bearing the brunt of diseases that prefer moist canopies. For more information on these issues, refer to the article in this edition: *Sclerotinia: One Pathogen, Multiple Hosts*, as well as articles from previous editions of the 2010 Crop Production News such as May 13: *General Health of Lentil Crops*; June 24: *Managing Disease in a Wet Year*; July 9: *Pulse Disease Update*; August 5: *When to Stop Applying Fungicides and Stemphylium Blight of Lentil*.

With the many unseeded acres in Saskatchewan this season, producers are considering winter wheat as an option this fall. There were some reports of Wheat Streak Mosaic Virus this summer and it is important to remember that this virus requires a "green bridge" of living susceptible plants to continue its disease cycle. Mites may transfer the disease from green spring wheat crops to emerging winter wheat crops if the latter is seeded too early. Wait until the spring wheat crops have matured – the rule of thumb is "green free" for at least one week – before planting winter wheat. For more information on other considerations in winter wheat, please refer to the article in this edition: *Nutrient Management Considerations for Winter Wheat on Unseeded Fields*, as well as articles in previous editions of the 2010 Crop Production News such as May 13: *Spring Considerations for Winter Wheat Production*; June 24: *Planting Winter Wheat on Unseeded Acres*.

NOTE: Throughout this document, you will see that some publications are in blue font and underlined, indicating links to website information. If you are reading this on your computer screen, click your cursor on the link to take you directly to the website. ✪

Crop Production News is a bi-weekly publication prepared primarily by provincial specialists with the Crops Branch and Regional Services Branch of the Saskatchewan Ministry of Agriculture. It is a compilation of articles related to entomology, plant pathology, weed science, soils and agronomy issues.

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Crop Protection Laboratory Update

By Philip Northover, AAg, Supervisor, Crop Protection Laboratory

Submissions to the lab have slowed in the past week, giving us a chance to catch our breath. Still, many of the submissions are challenging, as the effects of multiple factors such as weather, pathogens, insect activity and chemical injury have resulted in some complex symptoms. Dutch elm disease symptoms have become easier to recognize with the onset of hot summer weather.

Plant disease submissions have been similar to past weeks. Late blight of potato and tomato has invaded home gardens, and stemphylium blight has been found on many lentils. Samples that have been diagnosed with diseases caused by pathogens in the past two weeks include:

- Wheat: various root rots;
- Barley: net blotch;
- Lentils: stemphylium blight, ascochyta blight, anthracnose, botrytis blight;
- Canola: blackleg, fusarium root rot, botrytis blight, rhizoctonia root rot;
- Peas: mycosphaerella blight, ascochyta foot rot, fusarium foot rot;
- Potato: late blight;
- Turfgrass: fusarium root rot, pseudoseptoria leaf spot, melting out, bipolaris leaf spot;
- Vetch: ascochyta blight;
- Tomato: catface; and
- Crabapple: apple scab.

Figure 1.Wild licorice. Source: Saskatchewan Agriculture

Weed samples identified in the past two weeks include: prostrate pigweed (*Amaranthus graecizans*), biennial wormwood (*Artemesia biennis*), smooth bromegrass (B*romus inermis*) and wild licorice (*Glycyrrhiza lepidota*).

Insect samples identified in the past two weeks include: an ichneumonid wasp, water boatman (*Hesperocorixa atropodonta*) and damage attributed to ash plant bug.

Sixty-nine out of 158 Dutch elm disease submissions diagnosed to date this year have been confirmed positive. ☼

Agriculture Knowledge Centre Update

By Patrick Mooleki, PAg, Soil/Nutrient Management Specialist

The Agriculture Knowledge Centre (AKC) continues to receive calls on the timing and economic benefits of spraying fungicides to control diseases in pulses. The most frequent inquiry involved what should be done about grey mould and white mould at this time of the year with crops nearing the end of flowering and having thick canopies. There have been reports of lush canopies causing peas to lodge and rot at the bottom as well as lentils to flower but fail to pod.

The AKC received a couple of calls regarding the economic threshold and timing and control of diamondback moths and bertha armyworms.

The AKC is now getting more calls on desiccation, particularly in lentils. Concerned by the lush growth and extended flowering, producers are wondering whether desiccation with glyphosate would accelerate maturity and, if not, how that would affect green content in red lentils and quality of lentils in general.

Several calls were received on various forage issues such as over-wintering of standing forages, potential and impact of a second cut of alfalfa, maintenance of standing alfalfa, concerns over flooded forages (buy hay or sell the cattle), late-cutting standing forages, weed control in alfalfa, and late-seeding forages now. ✿

For information about submitting samples to Saskatchewan Agriculture's Crop Protection Lab, go to www.agriculture.gov.sk.ca (Programs and Services > Crop Protection Lab Services); or www.agriculture.gov.sk.ca/web_videos
Or phone (306) 787-8130.

Sclerotinia: One Pathogen, Multiple Hosts

By Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Disease and Dale Risula, PAg, Provincial Specialist, Special Crops

Sclerotinia sclerotiorum is a fungus that affects broad leaf crops. It is favoured by moist conditions; however, with Saskatchewan's relatively dry climate we have not been exposed to widespread infection over the years. This year was different, thanks to excess rainfall, thick crop canopies and available sources of inoculum. Numerous reports of sclerotinia-infected crops have been reported recently throughout much of the province, and infestations in lentil, pea, canola, sunflower and various vegetable crops can be expected.

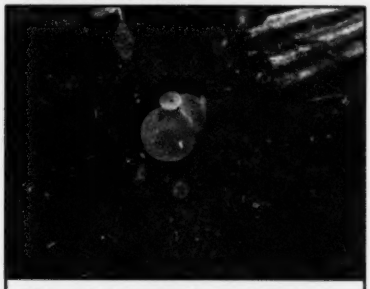

Figure 2. Apothecia produced by *Sclerotinia sclerotiorum* sclerotia
Source: Saskatchewan Agriculture

In canola and pulse crops, the disease cycle often begins with flower petal infection. Ascospores released by apothecia (Figure 2) infect flower petals, which are easier to penetrate than other plant parts. The fungus then uses flower nutrients to grow strong enough to infect other tissues after petals drop. Figure 3 shows mycelium and sclerotia produced by a canola petal infected with *S. sclerotiorum* and plated onto a nutrient medium. Fallen petals are sometimes trapped within the crux of a branch, a moist spot for infection to occur.

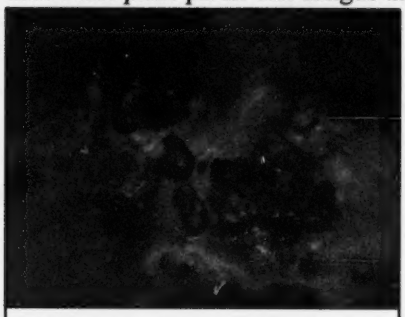

Figure 3. Mycelium and sclerotia produced by *S. sclerotiorum*
Source: Saskatchewan Agriculture

Infections tend to occur below the crop canopy: a humid, windless microclimate highly suitable for disease development. Infection of the plant stem adversely affects nutrient and moisture flow within the vascular tissue of the plant. This results in premature death of the plant or reduced yields. Eventually, sclerotia will form on or inside the plant (Figures 4, 5, 6) and drop into the soil before or during harvest, available to cause disease in the future. Rotation away from susceptible crops is required to prevent infection.

Figure 4. Pea pods containing *S. sclerotiorum* mould and sclerotia
Source: Saskatchewan Agriculture

In order to control this disease, fungicides need to be applied early. The most opportune time to apply fungicide is the beginning of flowering for pulses and 20 to 50 per cent bloom for canola. The completion of flowering and closure of the crop canopy effectively limits any impact fungicide might have on the situation, as the product is unable to reach the parts of the plant most heavily affected by the disease.

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Sclerotinia: One Pathogen, Multiple Hosts
(Continued from page 4)

Sclerotinia is a mono-cyclic disease, which means there is only one disease cycle per season. If you do not stop it before the disease cycle has reached the point of producing visible symptoms, it is too late to control.

Figure 5. Canola stem containing *S. sclerotiorum* sclerotia
Source: Saskatchewan Agriculture

Fungicides are not miracle cure-all products. They are made to protect the plant, not cure disease. Fungicides with so-called systemic effects usually refers to the chemical's ability to move into the immediate cell structure of the plant. The chemicals are not carried through vascular tissue to reach all parts of the plant; therefore, their effectiveness is based on contact with the immediate zone of concern. Spraying fungicides after their intended time of application will not benefit the grower, or the grower's pocket book. Economic gains are not realized if application is made too late, and there is no agronomic benefit.

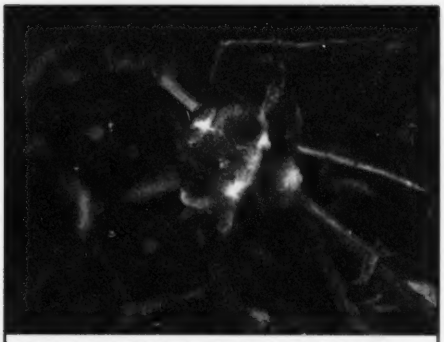

Figure 6. Lentil pods affected by white mould
Source: Saskatchewan Agriculture

For more information on this disease, see the Saskatchewan Ministry of Agriculture factsheets, *Sclerotinia Infection in Field Crops* and *Sclerotinia Rot of Vegetables.* ✿

Nutrient Management Considerations for Winter Wheat on Unseeded Fields

By Patrick Mooleki, PAg, Soil/Nutrient Management Specialist

Some producers are wondering how much they can cut back on fertilizer for winter wheat on unseeded acres. There is no one answer to this, as many variables come into play. Every situation is unique, and producers need to determine the nutrient status of the fields before they plant their winter wheat or any other winter cereal. Start with a soil test.

Soil testing is necessary because not every unseeded field will have sufficient nutrients just because no crop grew there this season. The inability to seed was due to excess moisture in most cases. Under such conditions, nutrients such as nitrogen and sulphur may leach away and be below the rooting depth of some subsequent crops.

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Winter Wheat on Unseeded Fields
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Nitrogen in the nitrate (NO_3) form is also subject to loss via denitrification under wet soil conditions, as it is converted to mostly nitrogen gas (N_2) and some nitrous oxide (N_2O) by denitrifying bacteria in the soil. Both forms are lost to the atmosphere.

Unseeded fields may also have been taken over by opportunistic weeds, which could have taken up a substantial amount of nutrients before they were controlled. Fortunately, most of the nutrients in the weed residue will be recycled into the soil as the weeds die and decompose, but this can take a growing season to occur.

Under other circumstances, the loss of nitrogen may be insignificant. Mineralization plus residual nitrogen, may supply most of the winter cereals requirements. Thus, a soil test would determine the levels of nitrogen required.

A soil test will also indicate how much phosphorus, potassium, sulphur and other nutrients are available and how much needs to be added. Phosphorus, in particular, is needed to encourage healthy root growth in seedlings prior to freeze-up to optimize the winter hardiness of the winter cereal crop.

Usually, about 20 pounds of nitrogen per acre is applied to winter cereals at time of seeding, and the balance, if required, is applied in early spring after a winter survival assessment is done. The required amount of nitrogen to apply is based on the measured soil nitrogen supply, subsoil moisture and expected growing season precipitation as it influences yield potential.

If producers want to apply all the required nutrients at the time of seeding, they should bear in mind the maximum safe rates of urea-nitrogen placed with the seed (see the Saskatchewan Ministry of Agriculture publication *Guidelines for safe rates of fertilizer placed with the seed*). If seedbed soil moisture is poor, the rate of seed-placed nitrogen should be reduced by at least 50 per cent. High rates of seed-placed nitrogen increase the risk of ammonia and salt toxicity, which results in delayed germination, reduced emergence and higher risk of winter injury. If higher rates of nitrogen are to be applied, consider pre-seeding banding (note that pre-seeding banding may reduce snow-trapping potential of the field), mid-row banding or side-banding to keep the nitrogen away from the seed row, or consider using a controlled-release urea. A controlled-release nitrogen fertilizer such as ESN can reduce potential ammonia or salt toxicity to the germinating seed or young emerging seedlings. Producers should follow product instructions on the safe amount that can be applied in the seed row.

Above all, producers need to ensure that there is sufficient stubble on the land to trap snow for insulation and moisture conservation. This may be a challenge on many unseeded fields. The important point is to get the winter wheat seeded at the appropriate time for your region (see Winter Wheat – FAQs, www.agriculture.gov.sk.ca/). ✿

Submitting Herbicide Resistance Samples to the Crop Protection Laboratory

By Carla Weitzel, Plant Health Technician, Crop Protection Laboratory and Jaclyne Shiplack, Plant Technician, Crop Protection Laboratory

The most important steps to get accurate results when testing for herbicide resistance are done before the samples even reach the lab. The following guidelines will help ensure that samples collected this fall and early winter can be tested properly and in a timely manner.

Figure 7. Example of a good wild oat sample
Source: Saskatchewan Agriculture

When submitting herbicide resistance samples to the Crop Protection Laboratory (CPL), ensure that the seed is from a mature, healthy plant that has not had pre-harvest herbicide applied. Open a few of the seed coats while you are collecting them and check for firm, fully-formed seeds without any discolouration. If the seed is immature or diseased, there is a higher probability that it will not germinate. This will prolong the testing period and could lead to inconclusive results. The sample should also contain as little foreign material as possible.

Once the seed sample is collected, it must be properly dried and placed in a **paper** bag. This should help keep the seed viable and prevent mould growth during shipping. Plastic bags, envelopes and other non-breathable containers should be avoided. If that is impossible, keep the container open until shipment to prevent rot from occurring. The sample can be packaged in a cardboard box along with a submission form and sent to the lab.

The herbicide group that is to be tested should be clearly marked on the submission form. In order to test the sample, the lab needs 1,000 seeds per group to be tested. For example, if only Group One is to be tested then only 1,000 seeds are required. If Group One and Two are to be tested then 2,000 seeds are required. This allows us to repeat the test if necessary. A brown paper lunch bag filled half way with seed provides an adequate amount.

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Submitting Herbicide Resistance Samples to the Crop Protection Laboratory
(Continued from page 7)

Figure 8. Example of a poor wild oat sample
Source: Saskatchewan Agriculture

Herbicide resistance testing is generally started in January, due to the dormancy period of wild oats. These samples are tested on a first-come basis. If you wish to have your results earlier in the year, the sample should be sent to the CPL in the fall and we can store them until testing starts.

Ultimately, these herbicide resistance tests are only one of the tools to be used when making decisions about herbicide applications. Follow proper herbicide rotational practices and consider using a different herbicide group if resistance is suspected. For more information, refer to the 2010 *Guide to Crop Protection.* ☼

Soil pH in Saskatchewan: Do I Really Have to Worry About Clubroot?

By Faye Dokken-Bouchard, PAg, Provincial Specialist, Plant Disease

Plasmodiophora brassicae, a microscopic pathogen causing clubroot, was identified more than 130 years ago, but chances are you didn't hear much about this disease of cruciferous crops until it was discovered on Alberta canola in 2003. Since then, reports and warnings of the disease have made headlines in the media, and the pathogen was declared a pest by both Saskatchewan and Alberta.

Despite one positive finding of clubroot DNA in a Saskatchewan soil sample in 2008, we still haven't seen symptoms of the disease in this province. Furthermore, research from Europe and on vegetables indicates that clubroot prefers low pH soil conditions, which doesn't seem to be a common situation in Saskatchewan (see Figure 9). You may be starting to wonder, "Do I really have to worry about clubroot?"

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Figure 9. Soil pH in Saskatchewan (white pH less than 5.5; red pH 5.5 to 6.0; yellow pH 6.1 to 6.7; green pH 6.8 to 7.5; orange pH more than 7.5)
Source: Saskatchewan Agriculture

Soil pH in Saskatchewan: Do I Really Have to Worry About Clubroot?
(Continued from page 8)

The short answer is yes. Clubroot is of particular concern where it already occurs because the disease can cause devastating yield losses in cruciferous crops, which include canola, mustard and camelina. Resting spores of the pathogen can survive in the soil for many years, and there are limited options to control it. Although it is true that clubroot is favoured by low pH soils, this does not mean that it will not occur on high pH soils. Other risk factors such as soil moisture, crop rotation and amount of inoculum will determine the potential severity of the disease (see Figure 10).

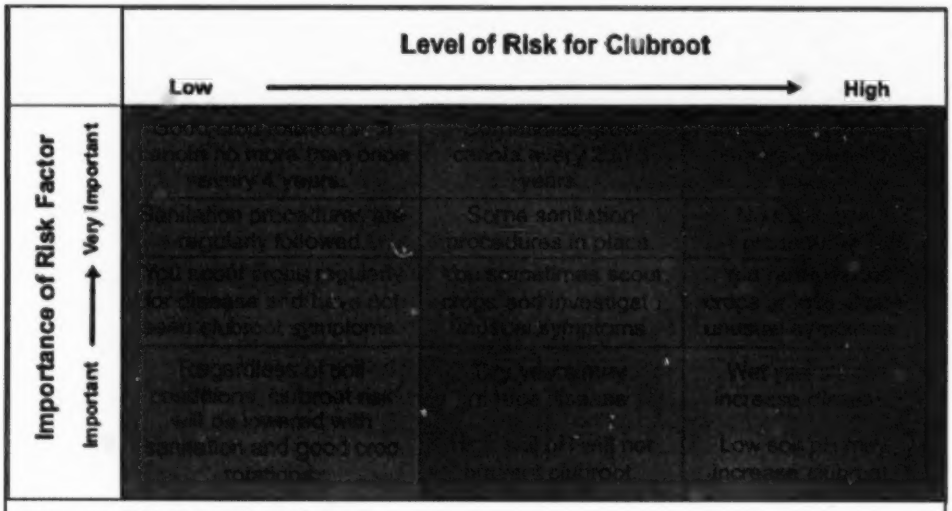

Figure 10. Risk factors for clubroot
Source: Saskatchewan Agriculture

Research from Europe indicates optimal conditions for clubroot resting spore germination is 24 C and pH 6.0 to 6.7; however, plants grown in higher pH soils are vulnerable to clubroot when other conditions (particularly wet soil) favour the pathogen. Similarly, while clubroot is considered a disease of wet soil, it has been reported during dry seasons in Europe. Therefore, wet, low pH soil conditions may be optimal for clubroot, but conditions outside of this do not exclude the possibility of disease, they merely decrease its severity when it does occur.

In areas where it does not occur (yet), regardless of the soil conditions, clubroot is still a concern as the disease can spread through the movement of soil contaminated with resting spores. Once introduced, short rotations of susceptible crops can build the disease to levels that will become visible and affect yields significantly.

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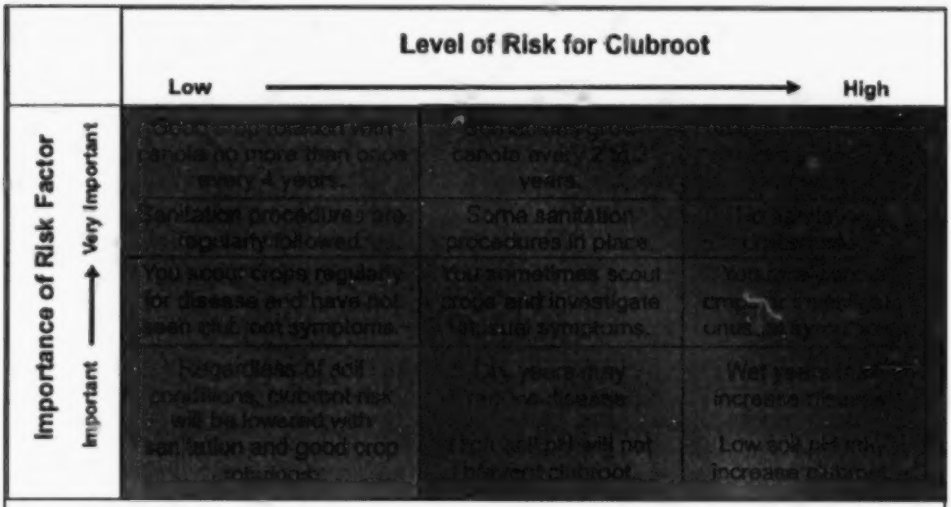

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Soil pH in Saskatchewan: Do I Really Have to Worry About Clubroot?
(Continued from page 9)

Clubroot research will help us learn more about the disease and find possible management strategies. Particularly, more research is required under Canadian prairie conditions to determine the extent to which different soil conditions affect clubroot development here. With that said, researchers here will tell you that experiments and observations thus far indicate a correlation between soil pH and clubroot, but the occurrence of disease is not limited to fields with acidic soils.

Risk levels will vary with agronomy and weather, but it is important to understand that there is a risk for clubroot in Saskatchewan, and prevention is our best choice. As canola crops mature this season, scout fields regularly and stay alert for suspicious stunting, wilting, yellowing and premature ripening. Check the roots of sick-looking plants for clubroot galls.

For more information, visit www.clubroot.ca or www.agriculture.gov.sk.ca and search the word "clubroot". ☼

Canola Harvest Tips

By Elaine Moats, PAg, Regional Crop Specialist, Weyburn

As harvest nears, the variability in the canola fields is becoming more evident. This year, there is everything from exceptional canola stands to crop that is short and poor, and these could all be found in the same field! There are some fields that look very good from the road, but the plants started branching out close to the ground, so that when the crop is swathed there will be little stubble left to anchor the swath. With all of this, many producers are questioning their canola harvesting options.

Figure 11. Canola swathing
Source: Saskatchewan Agriculture

Traditionally, canola is swathed to minimize shattering losses. Swathing at 50 to 60 per cent seed colour change on the main stem is considered optimal for both yield and quality. If producers feel they need to swath earlier than that, they need to make sure that the green seeds are firm when rolled between the thumb and forefinger. Swathing before the 15 to 20 per cent seed colour change stage can reduce yield potential and contribute to high green seed counts if the weather is hot and dry. When assessing fields, a rule of thumb is that seed colour change will normally increase 10 per cent every two or three days, but will be quicker under hot, dry conditions.

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Canola Harvest Tips
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When the crop is thin or short, it is difficult to anchor the swath to the stubble. To reduce the chance of the swaths moving with the wind, swath in the direction of the prevailing winds. Try to cut the plants just below the lowest pod and use a swath roller to push the swath down so that the edges are into the stubble. The crop may be on the ground or close to it, so curing and dry down may take longer.

If the crop is uneven, it may be possible to identify areas to cut at different times, but if it is too patchy, time swathing so that the majority of the yield has a chance of maturing before a killing frost. It takes about three full days of good weather after swathing to dry down a crop enough to prevent frost damage.

There is increasing interest in straight-combining canola. With some attention to detail, the Argentine type canola can be straight-combined, although this is not without risk. A good crop that is well knit together will shatter less than a thin, uneven crop. To reduce combine shattering losses, it helps to combine a ripe crop at higher seed moisture levels and then dry the crop for safe storage. Harvesting in the cooler part of the day or at night when the pods are damp with dew can help too.

A combine flex header has a cutter bar that extends out and the reel pulls the crop into the combine. If the reel is set properly, the shattering will happen over the table and the rest of the crop material will help pull the shattered seed into the combine. This is opposed to a bat reel that does just what the name implies – it bats the crop against the cutter bar and increases shattering losses.

What about the use of desiccants and pod sealants? Jim Bessel, with the Canola Council of Canada, says that there has been no cost-benefit shown from using a desiccant unless it is a dirty crop that benefits from the dry down of weeds. Pre-harvest herbicide applications for weed control may bring the crop in more evenly, but the producer must be ready and able to combine as soon as the crop is ready, otherwise the crop is exposed to shattering risk. Recent studies on pod sealants conducted by the Indian Head Agricultural Research Foundation did not show an advantage to their use. The most important part of successful straight-cutting canola appears to be to have a good crop, well knit together and no wind storms.

For more information about harvesting canola, contact your nearest regional crop specialist or the Agriculture Knowledge Centre at 1-866-457-2377. The Canola Council of Canada has an excellent website with detailed information about harvesting canola. It can be found at www.canola-council.org.

Good luck and have a safe harvest. ☼

New Saskatoon Berry Insect Issue Emerging in Alberta

By Forrest Scharf, AAg, Provincial Specialist, Fruit Crops and Greg Pohl, Canadian Forest Service

In July, Canadian Forest Service staff became aware of an insect infestation occurring on wild and cultivated saskatoon (*Amelanchier alnifolia*) bushes located in and around Lac La Biche, Alberta, (approximately 220 kilometres northeast of Edmonton). Lac La Biche is situated in the east-central area of Alberta's Central Mixedwood Boreal Forest region, a zone that typically contains poplars, white birch, white spruce and shrubs including native fruit such as saskatoons. Based upon leaf symptoms and a photo of an unusual adult moth taken in May by amateur photographer Stan Gosche, the lead investigator Greg Pohl suspects that **maple leafcutters** (*Paraclemensia acerifoliella*) are the insects causing the damage. This species is not normally found outside of southeastern Canada where its main host, sugar maple (*Acer saccharum*), occurs. It has never been reported on saskatoons. However, there are historical reports of maple leafcutters outside sugar maple range, in Riding Mountain National Park in Manitoba, and Kaslo, B.C.; there are also historical reports of similar feeding damage on birch trees in Saskatchewan, but the insect in this case was not confirmed. It is possible that the Alberta outbreak could be a related, unnamed species: positive identification awaits DNA analysis and examination of next spring's adult moths.

Figure 12. Typical leaf damage caused by leafcutters.
Source: Canadian Forest Service

These insects are moths of the *Incurvariidae* family (which are also known as "leafcutters"). Leaf damage occurs when the insect is a tiny caterpillar, about 6mm long. The caterpillars cut small ovals in leaves, and then construct a protective case from the cut pieces. The caterpillar fastens this case to the leaf surface, and lives inside it and skeletonizes the leaf (strips away the green tissue to leave only the leaf veins). The caterpillar feeds at the edges of its oval case so the skeletonizing has a characteristically curved or ringed shape, which can coalesce into large areas if many caterpillars are present.

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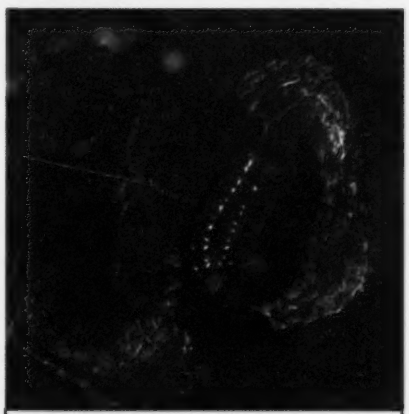

Figure 13. Caterpillar inside a case
Source: Canadian Forest Service

New Saskatoon Berry Insect Issue Emerging in Alberta
(Continued from page 12)

The damage becomes apparent in mid-July and continues until mid-August, at which point the larvae drop to the ground in their cases. The caterpillars then turn into small dark pupae, which change into moths the following spring to repeat the cycle (see Figures 12 and 13).

Outbreaks on sugar maples usually last a few years before the population dwindles to a very low level. It seems likely that the Alberta infestation will not become a serious threat to saskatoons in Saskatchewan. The Ministry of Agriculture encourages residents to inform the Provincial Fruit Crop Specialist (Forrest Scharf, 306-787-4666) if they suspect Maple Leafcutter infestations. ✿

REMEMBER TO FOLLOW PREHARVEST INTERVAL GUIDELINES WHEN APPLYING PESTICIDES:

Preharvest intervals (PHI) must be followed to prevent pesticide residues from being detected in the seed. The PHI is the number of days that must pass between the last application of a pesticide and harvest. Harvest is defined as the cutting of the crop or the removal of the product from the plant. The PHI includes direct combining, cutting (swathing) or grazing; it does not include swath-combining or baling for hay.

Refer to the pesticide label or the 2010 Guide to Crop Protection for more information on specific PHI's.

The ***Crop Production News*** is a publication of the
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